

1 **(April 5, 2004)**

2 ***Permanent Soil Nail Materials and Components***

3 A soil nail system is a structural system used to transfer tensile loads to soil. A soil nail
4 system may also be specified in the Plans as a nail. A soil nail system includes all steel
5 reinforcing bars, anchorage devices, grout, coatings, sheathings and couplers if used.
6

7 The Contractor shall either select a soil nail system from the Qualified Products List, or
8 submit the following information to the Engineer for approval:
9

- 10 1. Catalogue cuts or Manufacturer's Certificates of Compliance for centralizers
11 and grout admixtures.
12
- 13 2. Manufacturer's Certificate of Compliance for bearing plates, nuts, steel
14 reinforcing bars, tendon encapsulation tubing, and welded shear studs. The
15 Manufacturer's Certificate of Compliance for the nuts shall confirm compliance
16 with the specified strength requirements.
17

18 If the Contractor selects a permanent soil nail system from the Qualified Products List
19 (QPL), the Contractor shall submit, to the Engineer, a certificate from the permanent soil
20 nail system fabricator/supplier confirming that the material specifications of the
21 permanent soil nail system components as furnished conform to those specified in the
22 QPL submittal as approved by WSDOT.
23

24 **Component Material Specifications**

25 Bearing plates shall conform to ASTM A 36, ASTM A 529, ASTM A 536, ASTM A
26 572, ASTM A 588, or AASHTO M 270.
27

28 Centralizers shall be fabricated from plastic, steel, or material which is
29 nondetrimental to the prestressing steel. Wood shall not be used.
30

31 Grout shall be a neat cement grout or a sand-cement grout. The compressive
32 strength for the grout shall be as required by the soil nail manufacturer and as
33 approved by the Engineer. Grout components shall be as follows:
34

35 Admixtures shall conform to the requirements of Section 9-23.6. Expansive
36 admixtures and accelerators will not be permitted. Admixtures shall be mixed
37 in accordance with the manufacturer's recommendations.
38

39 Aggregates shall conform to the requirements of Section 9-03.
40

41 Cement shall conform to the requirements of Section 9-01, and shall not
42 contain lumps or other indications of hydration.
43

44 Nuts shall conform to either AASHTO M 291, Grade B, Hexagonal, ASTM A 536
45 Grade 100-70-03, ASTM A 29 Grades 12L14, 1215, or C1045, AASHTO M 169
46 Grades 1117 or 12L14, ASTM A 513 Type 5 Grade 1026, ASTM A 521 Class CF,
47 ASTM A 897 Grade 125/80/10M, or ASTM A 519 Grade 1026, and shall be capable
48 of developing 100 percent of the GUTS of the soil nail. The nuts shall be fitted,
49 where necessary, with a special wedge washer or spherical seat such that the nut
50 bears uniformly on the bearing plate.
51

1 Washers shall conform to either AASHTO M 293, ASTM A 536 Grade 80-55-06 or
2 ASTM A 47 Grade 32510.
3

4 Soil nails shall be deformed steel reinforcing bars conforming to AASHTO M 31,
5 Grade 60 minimum, and Section 9-07.2. All soil nails, except those specified in the
6 Plans to be encapsulated, shall be epoxy-coated in accordance with Sections 6-
7 02.3(24)H and 9-07.3. The soil nails shall be of the type and size specified in the
8 Plans. The soil nails shall not be spliced. The soil nails shall be threaded at the
9 bearing plate end a minimum of six inches. The threading shall be continuous
10 spiral deformed ribbing. Alternatively, threads may be cut into the soil nail if the bar
11 size is increased to the next larger size from the size specified in the Plans at no
12 additional cost to the Contracting Agency.
13

14 Tendon encapsulation, when specified in the Plans to provide additional corrosion
15 protection, shall be fabricated from one of the following:
16

- 17 1. High density corrugated polyethylene (PE) tubing conforming to the
18 requirements of ASTM D 3350 Class PE335520C or Class PE335400C,
19 ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness
20 of 40 mils.
21
- 22 2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784,
23 Class 13464-B, and having a nominal wall thickness of 40 mils.
24

25 The soil nails shall be centralized within the sheathing with a minimum 0.2 inch
26 grout cover over the soil nail inside the sheath. The encapsulation shall be
27 constructed at the factory under controlled conditions. Field construction of the
28 encapsulation will not be permitted.
29

30 Welded shear studs shall conform to Section 9-06.15, and shall be welded in
31 accordance with Section 6-03.3(25).